Sabbatical Proposal: Designing a Better Mobile Phone Instrument
Nathan Bowen, PhD, Music Professor

2015-2016

Background

I am in my sixth year teaching at Moorpark College and my first application for sabbatical leave. The last faculty member in our department to go on sabbatical was James Song in Spring 2004, now over a decade ago.

My area of expertise within music technology is mobile phone music. This was the subject of my dissertation, and I have published and presented two papers at international conferences since I have been at Moorpark College. I have also presented this work at the college on several occasions, perhaps most prominently as a lecture for Moorpark College's Year of Technology and Humanity. My focus has been on trends in mobile phone music as well as design. Although this area of research is obviously nascent—after all, mobile phones haven't been around very long—, there is tremendous interest within the music industry and academia to understand how people use mobile devices and design musical applications that can have deep penetration among users.

This has a direct impact on the students I teach, specifically those in the Introduction to Music Technology class. Designing musical scenarios with mobile phones requires a familiarity with computer programming, and also engages critical thinking in several ways. When students are asked to do Design-Based Learning projects oriented toward new musical instrument design, students must invent, extrapolate, adapt, and transform information to gain a deeper knowledge of multiple subjects. Designing a software-plus-hardware musical instrument invites students to delve into multiple disciplines in order to achieve an end product. They gain exposure to computer programming, interface design, mathematics, language acquisition, all within the context of music making. This orientation has lead to some of our top students transferring to premier institutions. Still, I see room for improvement.

As of now students only receive an introduction to programming, mainly for two reasons: first, there is only a single course currently offered in Music Technology, and second, my programming skills are not developed yet to support a curriculum that would adequately equip students to design, prototype, and implement their own app ideas. Yet in exit surveys for our Intro to Music Technology class, responses consistently indicate that the exposure to coding is not enough; they are looking for a second or even a third class in a sequence that allows their initial exposure to programming to become solidified. Additionally, many schools are moving toward a model that blends computer programming with the arts (for instance, Stanford University recently created a double major for computer science
and the humanities, including music). This is not only a potential growth area for FTES, but also an opportunity for students to fuse programming with the arts in the early phases of their undergraduate education. Current music technology certificate programs at the CCC level are typically oriented toward studio recording, which is an industry specialization that is becoming less viable as many recording studios are folding and high-quality equipment is becoming cheaper and widely available. From my vantage point, demand for musicians who can code (or creative coders) is eclipsing the demand for musicians who can operate a recording studio.

Many music departments at top-tier institutions are moving toward this model of arts plus programming, but additionally there is a larger community extending beyond academia that is interested in these issues, with the locus of activity being an international conference called New Interfaces for Musical Expression (NIME). This past year it was hosted in London at Goldsmiths University. This is where I hoping to carry out my project.

I have a track record of developing mobile musical instruments, but to date they have been tethered to a laptop or desktop computer configuration over wifi. The purpose has been to allow the computer to handle all sound processing duties while the phone has functioned primarily as a controller. The purpose here is to produce a self-contained instrument that handles both controller data as well as signal processing and audio production, while still maintaining the option of sending controller data to an external source.

**Sabbatical Proposal**

Over the course of one year (Fall 2015 to Spring 2016, preferably), I will deliver a new mobile phone musical instrument that relies primarily on precise hand positions to control sound production. The target audience for the instrument will be other developers and musicians within the NIME community, but the project has perhaps an even more important motive: to bolster my programming skills so that I can effectively develop curriculum down the road for the Moorpark College music technology program. While I am not attempting to generate new curriculum as part of the project deliverables, the aim is to be informed and ready upon return to develop a new Music Technology Certificate program.

**Project Description**

Up to this point I have only had cursory exposure to the technologies I hope to leverage. This would involve learning HTML5, the Web Audio API, Javascript, and other relevant languages, as well as machine-learning techniques. I will need time to learn how to implement these techniques and have a working knowledge of these scripting languages.
In my initial mockups I have investigated the ability to hold the phone in positions similar to the 12-hour clock face, with the phone held flat (like on a table) being a null/rest position. At this time I may also be needing to generate the OSC framework and develop the addressing and namespace system.

3. January/February 2016 – Develop the sound engine, possibly using Charlie Roberts’ Gibberish toolkit or other external resources. The focus at this time will be on generating sounds that have a high degree of nuance and expressiveness. I will explore sample-based processing as well as synthesis models.

4. March/April 2016 – Explore the possibility of zero configuration methods with other devices, and implementation of OSC proposals as outlined in my most recently published paper, at the International Computer Music Conference (ICMC).

5. May/June 2016 – Finalize visual interface design, menus and settings, and generate a user manual and tutorial videos on how to perform with the instrument. Generate at least one composition using the instrument, with performance score, and schedule premier concert performance.

Outcomes

My goal is to achieve three things. First, I will produce a compelling and functional interface and instrument that can foster disciplined and inspiring music. It will encourage a particular mode of physical expression while allowing the option for audio output to be handled by external sound sources. Second, I will create supplemental resources that can educate interested users on how to learn the instrument. These resources will likely take form in written instructions, diagrams and tutorial videos. Third, the instrument and resources will form a foundation for future curricular development at Moorpark College for the Music Technology Program. This project will provide the basis for accompanying publication and conference opportunities, which I will pursue. I truly believe that mobile phones can be a ‘game changing’ tool that steers society away from consumer-based music to a performance-centric form of live music making. I want to help hasten this movement.

Benefits to Faculty Member

- This project will help me become an expert in my field, one that is not simply staying informed on trends, but is helping to set trends. The goal is to produce a tool that meaningfully contributes to the current mobile music community, and becomes a viable instrument for interested musicians and non-musicians.
- I will be conducting my work at an institution that is at the forefront of digital musical instrument design.
ensure completion. I will also need to secure external funds in order to make this work. The cost of living expenses alone to be in London will require much more than the compensation outlined in the AFT contract, and feasibility hinges on successful grant applications. Because of this, I am considering a backup option to the London/Paris scenario. Another leading scholar in the field, Tae Hong Park at New York University, has also offered me a residency at NYU for the same year if I cannot raise sufficient funds to go abroad.

As many students already own mobile phones, the cost of using the instrument and performing will be negligible. The whole premise of this instrument is that it is low-cost, and open-source.

The immediate impact will be in the classes I teach, where this instrument will be demonstrated and tested. There is also potential for experimental ensemble workshops and concert performance. Within the Music Department and through the Program Planning process, the idea of expanding the Music Technology program has been discussed on numerous occasions and has been a target for potential growth. As the District and College are looking for areas that can attract students, the time is right for this kind of development. I want to ensure that we are doing so in a responsible way, and that I am trained to teach the skills students need to succeed.

The long-term aim will be to develop curriculum in the 2016-17 academic year and gain approval for a new certificate program to be offered the following academic year. From the start I will look for this program to be interdisciplinary, overlapping not only with Computer Science but also with other departments such as Graphic Design, Multimedia, Dance, and Business. As the program takes shape, the goal is to generate a certificate program that will equip students with skills specific to an industry that is growing and will likely continue to grow for the foreseeable future.

**Dissemination Upon Return**

With a functional mobile musical instrument ready for presentation, the aim will be to expose the instrument widely to the Moorpark College community and in particular within the Music Department. My deliverables will include a website that will be made available for interested parties to access the instrument (whether it is a download or simply a website one accesses via a web-browser on a phone), online tutorials, and any relevant documentation. This would be posted in the Final Report and published with all Sabbatical Final Reports at [http://www.vcccd.edu/committees/sabbatical-leave](http://www.vcccd.edu/committees/sabbatical-leave). I welcome the opportunity to present my work during department and division meetings, and in college- and district-wide professional development settings if/when applicable.
Dr. Nathan Bowen  
Moorpark College  

24 October 2014  

Dear Nathan,  

I would like to extend an invitation for you to join us as a visiting researcher in the Embodied AudioVisual Interaction (EAVI) research group during your sabbatical, 2015-16. As a visiting scholar, we will provide you with a desk in the Ben Pimlott Building on Goldsmiths campus; and an Internet connection. You will have access to the Goldsmiths Digital Studios (GDS) and the motion capture, sending, and audiovisual technologies in it. You will be responsible for all of your travel, housing, board, and incidental personal expenses.  

Your current research, Designing a Better Mobile Phone Instrument resonate well with themes we cover in EAVI and I believe that your visit will enable you to obtain UK and international experience.  

As a visiting scholar we would like to provide an opportunity for you to present you research to colleagues and students across a range of departments, to lecture and to collaborate with members of staff on special projects of mutual interest. We look forward to your contributions to Goldsmiths and hope that the visit will be a rewarding experience for you.  

Sincerely,  

Atau Tanaka